

DRAFT REMEDIAL ACTION WORK PLAN (INCOMPLETE)

DUCK VALLEY INDIAN RESERVATION OWYHEE, NEVADA

**Akana Project Number 16-005
April 12, 2022**

Prepared For:



Bureau of Indian Affairs

**1849 C Street, N.W. MS-4606
Washington, D.C. 20240**

Prepared by:



**6400 SE Lake Road, Suite 270
Portland, Oregon 97222**

This page has intentionally been left blank.

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS.....	iii
EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	1
1.1 SITE DESCRIPTION	1
1.2 RELEASE HISTORY.....	1
1.3 REMOVAL ACTIONS	2
2.0 NATURE AND EXTENT OF REMAINING CONTAMINATION	4
2.1 SOIL CONTAMINATION	4
2.1.1 East Area.....	4
2.1.2 West Area	4
2.2 GROUNDWATER CONTAMINATION	4
3.0 REMEDIAL ACTION OBJECTIVES.....	5
3.1 REMEDIAL ACTION OBJECTIVES.....	5
3.2 AREAS EXCEEDING CLEANUP GOALS	5
4.0 PRELIMINARY REMEDIAL ACTION FOR SOIL	6
4.1 PERMITTING.....	6
4.2 UTILITY CLEARANCE	6
4.3 SITE PREPARATION	6
4.4 EXCAVATION EXTENT AND METHODS.....	7
4.5 CONTROL MEASURES	8
4.6 PERIMETER AIR MONITORING DURING EXCAVATION.....	9
4.7 FIELD VARIANCES.....	9
4.8 CONFIRMATION SAMPLING AND ANALYSIS PLAN.....	9
4.9 TRANSPORTATION PLAN.....	9
4.10 RECORD KEEPING	10
5.0 PRELIMINARY REMEDIAL ACTION FOR GROUNDWATER.....	11
6.0 GROUNDWATER MONITORING AND REPORTING	11
6.1 MONITORING	11



6.2	REPORTING	12
6.3	FIVE-YEAR REVIEW	12
7.0	IMPLEMENTATION SCHEDULE	12
8.0	HEALTH AND SAFETY PLAN.....	12
9.0	REFERENCES	13

TABLES

- 1 Summary of Historic Soil Excavation Volumes

FIGURES

- 1 Site Location
- 2 Location of Former and Current Municipal Wells
- 3 Contaminant Source and Release Area Map 1999
- 4 Contaminant Source and Release Area Map 2002
- 5 Groundwater Monitoring Well Locations
- 6 Proposed Soil Excavation Areas (to be provided after data gap investigation)
- 7 Proposed Injection Boring Locations (to be provided after data gap investigation)

APPENDICES

- A Sampling and Analysis Plan/Quality Assurance Project Plan
(To be provided after data gap investigation)



ACRONYMS AND ABBREVIATIONS

AST	Aboveground storage tank
bgs	Below ground surface
BIA	U.S. Bureau of Indian Affairs
DVIR	Duck Valley Indian Reservation
EPA	U.S. Environmental Protection Agency
FFS	<i>Preliminary Focused Feasibility Study Report</i>
HASP	Health and Safety Plan
IHS	Indian Health Services
OSHA	Occupational Safety and Health Administration
PHC	Petroleum hydrocarbons
TPH-d	Total petroleum hydrocarbons as diesel
TPH-g	Total petroleum hydrocarbons as gasoline
UST	Underground storage tank
VOCs	Volatile organic compounds



EXECUTIVE SUMMARY

This Draft Remedial Action Work Plan has been prepared on behalf of the U.S. Bureau of Indian Affairs (BIA) for the remediation of the petroleum hydrocarbon impacts to Trust Resources in the town of Owyhee, Nevada, on the Shoshone Paiutes of Duck Valley Indian Reservation. This Plan is in fulfillment of the requirements of Akana contract A16PX00431, Task 11, Remedial Implementation Plan. The Plan presents the Draft Scope of Work for selected remedies identified in the *Preliminary Focused Feasibility Study Report* (FFS) (Akana 2021). The recommended Cleanup Action Alternative 2 was recommended, which includes limited soil removal (excavations) and injections of biotreatment amendments to enhance the rate of degradation of dissolved petroleum hydrocarbons in the groundwater. The FFS also identified several data gaps that need to be addressed prior to selecting a final remedy for the site. A Scope of Work to address the data gaps is being prepared by the BIA and will be implemented in late 2022 and 2023. The site data collected from the 2022 and 2023 field investigations will be used to revise the preliminary FFS and finalize the Remedial Action Work Plan. This Plan is considered incomplete until it can be informed by the additional data gap assessments planned in the near future.



1.0 INTRODUCTION

The Bureau of Indian Affairs (BIA) contracted Cooper Zietz Engineers, Inc, dba Akana, to provide this Draft Remedial Action Work Plan (Plan) for the remediation of the petroleum hydrocarbon impacts to Trust Resources in the town of Owyhee, Nevada, on the Shoshone Paiutes of Duck Valley Indian Reservation (DVIR). This Plan is in fulfillment of the requirements of Akana contract A16PX00431, Task 11, Remedial Implementation Plan. It provides preliminary remedial actions to address the remaining risk from releases of total petroleum hydrocarbons in the diesel organic range (TPH-d) and total petroleum hydrocarbons in the gasoline organic range (TPH-g) through the historic use of heating oil and other fuels stored in aboveground storage tanks (AST) and underground storage tanks (UST).

The Plan is based on past site assessments and cleanups conducted to date. While extensive soil and groundwater assessments have been conducted in the past, additional site assessment activities, including a soil gas survey and soil and groundwater assessments, are recommended prior to refining and selecting the actionable remedy for the petroleum impacts in the town of Owyhee. This Plan is considered incomplete until it can be informed by the addition data gap assessments planned in the near future. (Additional assessment activities proposed in a 2022 - 2023 Scope of Work will inform the actions of this Plan)

1.1 SITE DESCRIPTION

The town of Owyhee is located within the northeast quarter of the DVIR (see Figure 1). The main access to DVIR and Owyhee is via Nevada State Highway 225 from the north and south. The town contains residential neighborhoods, a hospital, a police station/correctional facility, a post office, schools, a telephone company, education offices, a senior citizen center, Great Basin College, and the tribal courthouse and community center. The town also contains numerous BIA structures, including a road maintenance shop, irrigation shop, and several quarters for BIA personnel. The general layout of the town and site structures are shown on Figure 2.

1.2 RELEASE HISTORY

In February 1985, 8,000 gallons of heating oil was delivered to a 16,000-gallon AST, located approximately 75 feet east of Highway 225, near an old power plant. Five days later, before the 8,000 gallons should have been consumed, the tank was empty, suggesting that the underground heating oil distribution pipeline that carried fuel to BIA residences and buildings throughout the town of Owyhee had substantial leaks. Use of the heating oil pipeline was discontinued in 1985, and the 16,000-gallon AST continued to be used to store fuel, which was transferred by trucks to individual consumers. The former heating oil distribution system is shown on Figure 3.



In October 1987, an odor of oil was noticed in municipal Well #1. By March 1988, the odor was so strong that Well #1 and nearby municipal Well #2 were taken out of operation and municipal Well #3 was placed into service.

In March 1988, the Indian Health Service (IHS) reported that the Owyhee public water contained a petroleum-like taste. The Shoshone Paiute Tribe excavated nine test pits, excavated to a depth of 12 to 15 feet east, west, and north of the Tribal Maintenance Building. Free-phased hydrocarbons were observed in two test pits north of Tribal Maintenance Building, between the building and the municipal Wells #1 and #3. Soil was excavated along the buried distribution pipeline in front of the Tribal Maintenance Building to groundwater. At least two leaks were discovered in the pipeline. Soil sampling analyses for TPH-d reported concentrations ranging from 11,000 to 12,000 milligrams per kilogram.

In March 1988, a 12,000-gallon diesel UST located on the east side of the BIA Roads Shop building and a 12,000-gallon diesel UST located south of the Old Power Plant (east of the Highway) were removed. No petroleum hydrocarbon-impacted soil was reported in either excavation. No soil test data was provided for this activity. Neither UST was connected to the distribution pipeline.

In 1992, municipal Owyhee Well #2 was installed approximately one mile to the northwest of Well #1. Well #2 was added to the community water supply. Owyhee Well #3 was installed in 1999, approximately one-half mile south of Well #1 and Well #2. Locations of former and current municipal wells are presented on Figure 2.

1.3 REMOVAL ACTIONS

In 1995 and 1996, the BIA contracted the removal of approximately sixty feet of heating oil distribution pipeline northeast of the Tribal Maintenance Building, near the intersection of BIA Road and Gah-Nee Road. During the pipeline removal, soil within the excavation was observed to have been impacted the entire length of the pipeline. The BIA also plugged and abandoned an injection well, removed and disposed of several leaking drums containing used motor oil, road sealant, and herbicides (2,4-D, 2,4,5-T and Dinoseb) from the BIA Roads Yard. Approximately 40 cubic yards of Dinoseb-impacted soil were excavated to a depth of seven feet.

In 1999, Cherokee General Corporation and SECOR International Incorporated (SECOR) removed most of the remaining oil pipeline and removed significant quantities of petroleum hydrocarbon-impacted soils where feasible. SECOR conducted a subsurface investigation to estimate the remaining impact to soils and groundwater and characterized the hydrogeology of the site. The results from the investigation suggested four major releases (Locations 1 through 4) and two moderate releases (Locations 5 and 6) as follows:

Location 1. Along the heating oil pipeline east of Highway 225



Location 2. At a former heating oil UST, 200 feet west of Highway 225

Location 3. At a 90-degree turn in the pipeline 475 feet west of Highway 225 at the intersection of L Street and C Street

Location 4. Along the pipeline near the location of six ASTs in the Tribal Maintenance Yard

Location 5. At a former UST location in the northern area of town near the correction facility

Location 6. At the discharge pipe outlet in the BIA Road Shop Yard

Of these releases, SECOR reported that four (Locations 2 through 5) appeared to have impacted groundwater in the area of the releases, and to the northwest. Evidence of groundwater impact in these four areas consisted mainly of TPH-d, although groundwater downgradient of the Tribal Maintenance Yard release (Location 4) contained both TPH-d and TPH-g. Groundwater was not encountered during excavation in Location 1. Groundwater samples collected in the area surrounding the discharge pipe outlet (Location 6) indicated that groundwater was not impacted.

Other areas where petroleum releases occurred along the pipeline and at former storage tank locations were investigated by SECOR in 1999 and mitigated through soil removal. Relatively shallow subsurface soils that were impacted with petroleum products by past activities (e.g., equipment storage) at the BIA Road Shop area were also excavated and removed. In total, approximately 2,850 cubic yards of impacted soil were removed from throughout the site. Of the 30 areas excavated during this investigation, petroleum hydrocarbon-contaminated soil was left in 18, due to the location of buildings, structures, roads, or utilities which prevented further excavation, or where the amount of clean soils overlying impacted areas made the removal of soils cost prohibitive. A summary of the historical excavation areas and approximate volumes removed is provided in Table 1, and locations of excavations are shown in Figure 3.

In 2002, the BIA contracted Western Construction Incorporated (Western) to begin grading and paving roads throughout Duck Valley. While the roads were under construction, Western, under SECOR's supervision, excavated petroleum hydrocarbon-impacted soils from beneath the roads where impacted soils had been left during the 1999 investigation. During construction, SECOR conducted an investigation that resulted in Western excavating approximately 1,932 yards of soil. Impacted soil was excavated from beneath roads and transported by Western to a licensed disposal facility.

The total volume of soils excavated in 2002 consisted of:

- 1,348 cubic yards from the areas near the intersection of L Street and C Street (L7 area)
- 560 cubic yards from the area along the pipeline near the ASTs in the northeast corner of the Tribal Maintenance Yard (L34 area)



- 24 cubic yards from approximately 50 feet west of Highway 51 along the northern edge of D Street (L18 area)

Impacted soils remain in the L7 and L34 areas along utility corridors and beyond the street right-of-way. TPH-impacted groundwater and “smear” zones remain throughout the L7 and L34 areas. SECOR reported that impacted soils in the L18 area appear to have been removed. Excavations are presented in Figure 4.

2.0 NATURE AND EXTENT OF REMAINING CONTAMINATION

2.1 SOIL CONTAMINATION

2.1.1 East Area

Based on the historic soil data, impacted soil remains at depth near, and potentially under, the Power House (Building 333). In the area near residence 310, only shallow soil samples were collected and no over excavation of impacted soil was reported. To estimate the remaining TPH-d-impacted soil in this area, Akana recommends collecting additional soil samples.

2.1.2 West Area

SECOR estimates that approximately 500 cubic yards of PHC-impacted soil remains at excavation L34, under or adjacent to B Street, and approximately 500 cubic yards of PHC-impacted soil remains at excavation L7, under or near L Street. Akana recommends advancing soil borings around the excavations L7 and L34 to provide data to estimate the volume of PHC-impacted soil remaining in this area.

2.2 GROUNDWATER CONTAMINATION

Thirty groundwater monitoring wells, MW-1 through MW-30, were installed between 2000 and 2008 to characterize the local groundwater flow system and the presence of PHCs in shallow groundwater. The locations of monitoring wells are shown on Figure 5. The wells have been monitored and sampled periodically, at times on a quarterly basis. Wells MW-16, MW-17, and MW-18, located at the former IHS hospital north of town, and wells MW-4 and MW-5, west of the Road Maintenance Building, were plugged and abandoned in 2008. In 2018, three additional monitoring wells (MW-31, MW-32 and MW-33) were installed and monitoring well MW-1 was abandoned and replaced with monitoring well MW-1R.

Akana conducted an assessment of supplemental groundwater analytical monitoring well network results collected quarterly from October 2018 to December 2019 (Akana 2021a). The supplemental groundwater data indicate that TPH-d and TPH-g concentrations decreased in groundwater across



the site compared with historical concentrations. Considering the data's seasonality, concentrations of the detected PHC appear to have plateaued since the October 2018 monitoring event and are not declining further.

The areal extent of TPH-d and TPH-g has decreased over time and is currently stable. The TPH-d and TPH-g data from the 2019 quarterly sampling events show that these compounds are consistently detected at similar concentrations in wells located in five areas where residual PHCs still reside in subsurface soils at depths spanning or near the water table. The highest concentrations of PHCs in groundwater continue to be detected in monitoring wells MW-23 and MW-24. Wells in the other four areas also exhibit detectable, but lower, concentrations of one or more PHCs. *This text needs to be updated after the 2022 2023 data gap investigation is completed.*

3.0 REMEDIAL ACTION OBJECTIVES

3.1 REMEDIAL ACTION OBJECTIVES

Akana proposes to use the U.S. Environmental Protection Agency (EPA) risk-based soil screening levels for protection of groundwater (EPA 2017) and EPA vapor intrusion screening levels for groundwater volatilization to indoor air. Local groundwater in the town of Owyhee is not currently used for drinking water and is not reasonably likely to be in the future. Active cleanup of the groundwater will not be based on groundwater consumption but may be managed by institutional controls and deed restrictions.

Trench worker exposures are a concern that will need to be addressed for soils near utilities under the roadways of Owyhee and under foundations of BIA buildings (the former Power House and Building 310). Removal or cleanup of these soils will also improve the groundwater quality and expedite restoration of the groundwater.

3.2 AREAS EXCEEDING CLEANUP GOALS

Areas exceeding the cleanup goals for soil and groundwater are shown on Figures 6 and 7, respectively.

This section and figures will be updated after 2022-2023 data investigation has been completed.



4.0 PRELIMINARY REMEDIAL ACTION FOR SOIL

This remedial action includes excavation and proper disposal of the PHC-impacted soil from the vadose and saturated zones within the target areas. Once the contaminant mass source in the soil is removed, the groundwater concentrations are expected to decline significantly as a result through both MNA and enhanced treatment using amendments. Demolition of buildings 310 and 333 to allow access to subsurface soils for soil excavation - source area mass removal. The adequacy of the excavation remedy will be verified by compliance soil sampling and long-term groundwater monitoring.

4.1 PERMITTING

Excavation and soil handling will be conducted by a qualified, HAZWOPER-trained contractor, using conventional earthwork equipment. The contractor will prepare a site-specific Health and Safety Plan (HASP) to comply with 29 CFR 1910.120, as discussed in Section 8.0.

4.2 UTILITY CLEARANCE

Underground Service Alert (USA) will be contacted at least 48 hours prior to excavation activities, to identify the location of utilities that enter the property. All proposed excavation areas will be clearly marked with white paint or surveyors' flagging, as required by USA. USA will contact all utility owners of record within the site vicinity and notify them of the intent to excavate. All utility owners of record will be expected to clearly mark the position of their utilities on the ground surface throughout the designated area.

4.3 SITE PREPARATION

Conventional construction equipment, such as a front-end loader equipped with a backhoe, will be used to remove the asphalt cover and any remaining concrete footings, concrete foundations, or buried utility piping, and a concrete clarifier that reportedly remains on site. Stained or corroded asphalt, concrete, and piping will be segregated and disposed as hazardous waste. The remaining material will be disposed as construction debris.

To access PHC source areas in the eastern area of the site, the former Power House, an AST north of the former Power House, and BIA Residence 310 on Justice Road will be demolished. The contractor shall review available building assessments and prepare a demolition plan for BIA approval prior to removing the structures.



4.4 EXCAVATION EXTENT AND METHODS

The upper 3 feet of soil at the proposed excavations shall be field screened and stockpiled separately from the contaminated soils for potential reuse. Due to engineering constraints, the depth of excavation will be limited to [#] feet below ground surface (bgs), as shown on Figure 6. The excavation could remove soils locally in some hot spot areas to deeper than [#] feet bgs if warranted (for example, if heavy staining is observed or if confirmation sampling results indicate that site cleanup goals have not been attained). Akana estimates that the total in-place volume of impacted soil for excavation is about [xxxx] cubic yards.

Excavation areas will be sloped or benched at a minimum slope of [#] to provide appropriate slope stability protection, in accordance with Occupational Safety and Health Administration (OSHA) regulations. If needed, a ramp leading into the excavation will be sloped at a minimum of [#] to allow for safe backhoe/excavator access. Soil excavation activities are expected to take approximately [#] weeks to complete. Work would be conducted between 7 am and 5 pm, Monday through Friday.

Based on previous sampling data and other evidence, such as soil discoloration and odors, and field screening with an organic vapor meter, excavated soil will be categorized for stockpiling as either (1) potentially reusable fill; or (2) soil potentially requiring off-site treatment or disposal. The source of the clean backfill material, certification that the fill is clean, and supporting analytical data will be obtained from the excavation subcontractor and submitted to the BIA approximately five working days before beginning excavation activities at the site. The source of the fill material cannot be included at this time because the excavation subcontractor and the specific fill material source have not been identified. Once excavated, soil will be segregated into the appropriate stockpile.

Segregation activities on site may be limited by space constraints and excavation timeframes. Soil stockpile locations will be determined prior to initiation of remedial actions through coordination with the property owners and operating businesses on site. At this time, it is anticipated that the stockpiled soil will be placed [location].

If not directly loaded into trucks, the excavated soil will either be stockpiled or placed in covered soil bins until characterization and disposal arrangements are completed. Stockpiled soil will be placed on plastic sheeting and covered with plastic sheeting when not actively being worked on and at the end of each workday. Sandbags or other weights will be used to keep the plastic cover in place.

Soil samples will be collected and submitted for chemical analyses to evaluate on-site reuse and disposal alternatives at a frequency of at least three discrete sample analyzed per 100 cubic yards. Off-site disposal of the affected soil that is unsuitable for reuse on-site will be conducted based on the soil stockpile analytical results, with appropriate documentation and in accordance with applicable federal, state, and local regulations.



A geotechnical field technician will provide observation and testing services during backfill operations. The clean backfill material will be moisturized as needed by hose or water truck prior to placement or mixed as the fill material is being placed. Fill will typically be placed in 12-inch lifts and compacted. In situ density tests will be performed to determine when a minimum relative compaction rate of 90 percent has been achieved relative to the maximum dry density. The backfilling process will continue until the desired site grade is reached. A compaction report will be submitted to the BIA.

4.5 CONTROL MEASURES

Depending on soil conditions, the airborne dust could be generated during excavation activities. Dust-control measures will comply with local Air District feasible control measures to protect on-site and off-site receptors from chemicals in soil and nuisance dust. Dust suppression will be performed by lightly spraying or misting the work areas (such as the excavation, soil handling areas, and haul roads) with water, or a similar surfactant if water is not sufficient to reduce the potential for dust generation. Factors considered in providing fugitive dust control measures will include wind direction, wind speed, and available dust control and dust suppression methods.

To minimize dust generation, watering of the active excavation areas will be conducted throughout the removal action. Misting may also be used on soil placed in the transport trucks. Efforts will be made to minimize the soil drop height from the excavator's bucket onto the soil pile or into the transport trucks. The excavator will be positioned to load or stockpile soil from the leeward side. After the soil is loaded into the transport trucks, it will be covered to prevent soil from spilling out of the truck during transport to the treatment or disposal facility. Additionally, soil stockpiles and truck beds containing soil will be covered to minimize the potential for dust generation. While on the property, all vehicles will maintain slow speeds (e.g., less than 5 miles per hour) for safety purposes and for dust-control.

To control off-site migration of impacted soil, stormwater and vehicle decontamination measures will be implemented. If precipitation is anticipated, engineering controls will be implemented to minimize the collection of rainwater in the excavation. A vehicle cleanup/decontamination area will be established as close to the excavation or loading areas as possible to minimize spreading the impacted soil. Before exiting the job site, all vehicles' tires will be inspected and brushed in the cleanup area, if necessary, to ensure that impacted soil remains on-site.

The site currently has permanent fencing installed; however, part of this fencing, especially along the southern boundary, will need to be removed to allow heavy equipment access to the site. These areas will be secured at night using temporary fencing to reduce the potential for unauthorized personnel to enter the excavation area. Low-visibility with low-permeability windscreen will be attached to the temporary and permanent fencing prior to commencement of on-site activities.



4.6 PERIMETER AIR MONITORING DURING EXCAVATION

Air monitoring activities will be conducted in the work zone and in the immediate perimeter by the Site Safety Officer during excavation. This section describes the perimeter air monitoring program: work zone air monitoring is addressed in the HASP.

Airborne particulate monitoring will be conducted to verify and document the effectiveness of dust suppression measures, in conformance with the air management district requirements. Monitoring will be performed during the excavation activities at the perimeter of the property using an upwind/downwind sampling approach. Volatile organic compounds (VOC) are not expected to be encountered during excavation activities, based on low VOC concentrations in the site soil. Air monitoring will be conducted as a safety precaution, using a direct reading photo-ionization detector during excavation and soil handling activities, as specified in the HASP.

4.7 FIELD VARIANCES

Variances from the Work Plan will be discussed with the BIA prior to any action being taken, except for emergencies (when an immediate response is required). The BIA will be notified if an emergency response is implemented. The field variances will be documented in the Completion Report prepared for the project.

4.8 CONFIRMATION SAMPLING AND ANALYSIS PLAN

Soil samples from the sides and bottom of the completed soil excavation will be collected to assess PHC concentrations. The exact confirmation sample locations will be verified in the field, in consultation with the BIA. Sample locations and the number of samples collected may be adjusted in the field if necessary. After the impacted area has been excavated to the appropriate depth, one soil sample will be collected for every 500 square feet of the bottom of the excavation. Samples will be collected primarily using the excavator bucket. One sidewall soil sample will be collected for every 15 linear feet of sidewall, at depth intervals corresponding to areas exhibiting field indications of potential contamination and at depths where previous samples indicated contaminants were present. Sidewall samples will be collected using the backhoe or excavator. Field quality control samples, which include field duplicates, will be collected for 10 percent of the soil samples.

4.9 TRANSPORTATION PLAN

The construction contractor must comply with all applicable federal, state, and local laws, codes, and ordinances that govern or regulate contaminated soil transportation. Prior to transportation, the construction contractor will obtain all required permits and furnish all labor, materials, equipment, and incidentals required for soil transport. They will ensure that all drivers hauling



contaminated soil have in their possession during hauling all applicable state and local vehicle insurance requirements, a valid driver's license, and vehicle registration and license. The construction contractor will inform all drivers of haul vehicles of the nature of the material being hauled; the route to and from the disposal site or disposal staging area; applicable city street regulations and requirements; State of Oregon Department of Transportation codes, regulations and requirements; and the legal maximum load limits per vehicle. The construction contractor will ensure that the following requirements are met:

- Truck inspections and cleanings will occur in the excavation staging area.
- Contaminated soil will not be spilled or tracked off-site.
- No visible or measurable airborne soil (i.e., dust) will leave the site.
- Each truck load of contaminated soil will be covered with a well-secured tarp prior to leaving the site.
- Soil on the exterior of trucks and other equipment will be removed using brooms and hand tools prior to the vehicle leaving the work area.
- Trucks will not exit the site if liquids are draining from the load.
- The construction contractor must be prepared to install a liner in the trucks upon request.
- Trucks used for transportation of contaminated soil will be substance-compatible, licensed, insured, and permitted pursuant to federal, state, and local statutes, rules, regulations, and ordinances.

4.10 RECORD KEEPING

The remedial action contractor will be responsible for maintaining a field logbook, which will serve to document observations, personnel on site, equipment arrival and departure times, and other important project information. Logbook entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will be bound, with consecutively numbered pages, and each page will indicate the date and time of the entry. All entries will be legible, written in black or blue ink, and signed by the author. Language will be factual and objective. If an error is made, corrections will be made by crossing a line through the error and entering the correct information. Corrections will be dated and initialed.

Any soil that is profiled as non-hazardous and sent off site for disposal or treatment will be documented using a Non-Hazardous Waste Manifest or Bill-of-Lading form. At a minimum, this form will include the following information:

- Generator name and address



- Transportation company
- Accepting facility name and address
- Waste shipping name and description
- Quantity shipped

Prior to transporting the excavated soil off site, an authorized representative of the BIA will sign each non-hazardous waste manifest. The removal action site manager will maintain one copy of all waste manifests on site.

5.0 PRELIMINARY REMEDIAL ACTION FOR GROUNDWATER

The groundwater remedial action is in situ bioremediation. In situ bioremediation consists of injection of food substrate, nutrients, and potentially more aggressive PHC-degrading bacteria into the groundwater zone to decrease the dissolved PHCs contaminant mass in the groundwater source area. This will be conducted after the limited soil excavations have been completed. Figure 7 depicts proposed injection boring locations.

The material (TBD) will be injected into the source area perimeter to act as a containment barrier for the interior source area injections. The material will also be injected into the source area interior to treat the higher PHC concentrations located there. After each injection round is completed, long-term groundwater monitoring for at least 3 to 5 years would be required to ensure that the source area has been adequately remediated.

To effectively remediate the groundwater area identified above, a total of [#] injection points will be installed. The injection points will be spaced about [#] feet apart around the perimeter of the source area, assuming a radius of influence of about [#] feet (Figure 7). Injection volume into groundwater is approximately [#] gallons of [material] per injection point, based on an injection radius of [#] feet, and a saturated zone thickness of [#] feet.

6.0 GROUNDWATER MONITORING AND REPORTING

6.1 MONITORING

Performance monitoring will be conducted for a five-year period following the full implementation of the selected remedy. Groundwater samples will be collected from compliance wells downgradient of the remedial excavations and collected from wells identified downgradient of the dissolved groundwater contamination. The number of wells sampled and methodology will be documented in the Quality Assurance Project Plan included in Appendix A. Wells will be monitored quarterly for the first year and semiannually for the following four years.



6.2 REPORTING

Groundwater monitoring compliance reports will be prepared and submitted to the BIA annually and shall include a summary of field activities, groundwater elevations, and groundwater data, summarized in tabular form and in site figures illustrating the groundwater flow direction and groundwater elevation contours. The reports will discuss the groundwater trends and compliance and provide recommendations.

6.3 FIVE-YEAR REVIEW

The final remedy shall be evaluated after a period of five years from the completion of construction and startup of the final remedy and every five years thereafter, if needed. The review and reevaluation shall be conducted to determine if human health and the environment are being adequately protected by the remedial alternative(s) implemented. A report will be submitted to the BIA containing the results of the five-year review. The report shall describe the results of all sampling analyses, tests, and other data generated or received and evaluate the adequacy of the implemented remedy in protecting human health and the environment.

7.0 IMPLEMENTATION SCHEDULE

To be determined based on final Remedial Action Plan

8.0 HEALTH AND SAFETY PLAN

All contractors will be responsible for operating in accordance with the current requirements of 29 CFR 1910.120, State and Federal Standards for Hazardous Waste Operations and Emergency Response. On-site personnel are responsible for operating in accordance with all applicable OSHA regulations and 29 CFR 1910 and 29 CFR 1926, Federal Construction Industry Standards, as well as other applicable federal, state, and local laws and regulations.

A site-specific HASP will be prepared for the site or the existing HASP will be updated in accordance with current health and safety standards, as specified by OSHA and submitted to the BIA prior to initiation of field work. The provisions of the HASP are mandatory for all personnel are at the site. The contractor and its subcontractors doing fieldwork in association with this Plan will either adopt and abide by the HASP or develop their own safety plans which must, at a minimum, meet the requirements of the HASP. All on-site personnel shall read the HASP and sign the HASP "Plan Acceptance Form" before starting site activities.



9.0 REFERENCES

- Akana. 2016. "Technical Memorandum: Summary of Current Conditions of Monitoring Wells." Submitted to the Bureau of Indian Affairs (BIA), Western Regional Office, Phoenix, Arizona. May 12.
- Akana. 2018. "Supplemental Remedial Investigation Work Plan." Submitted to the BIA, Western Regional Office, Phoenix, Arizona. May.
- Akana. 2019a. "Field Report, Supplemental Remedial Investigation." Submitted to the BIA, Western Regional Office, Phoenix, Arizona. May.
- Akana. 2019b. "Second Quarterly Groundwater Monitoring Data Report." Submitted to the BIA, Western Regional Office, Phoenix, Arizona. June 25.
- Akana. 2019c. "Third Quarterly Groundwater Monitoring Data Report." Submitted to the BIA, Western Regional Office, Phoenix, Arizona. October 3.
- Akana. 2021a. "Groundwater Assessment Report." Submitted to the BIA, Western Regional Office. Phoenix, Arizona. August 6.
- Akana. 2021b. "Preliminary Focused Feasibility Study Report." Submitted to the BIA, Western Regional Office, Phoenix, Arizona. September 23.
- DSE. 2013. "Duck Valley Indian Reservation, Groundwater Assessment, Groundwater Contaminant Characterization and Groundwater Monitoring, Owyhee, Elko County, Nevada." Submitted to the BIA, Western Regional Office, Phoenix, Arizona. November.
- MSE. 1995. "Characterization, Packaging, and Labeling of Materials in Owyhee, Nevada." Prepared for the BIA by MSE. Idaho Falls, Idaho. July 18.
- Nevada Department of Environmental Protection (NDEP). 2014. "NDEP Draft Guidelines for Discovery Events (Soil RCs)." Version: 01/28/2009. Accessed at: https://ndep.nv.gov/uploads/env-sitecleanup-guidance-docs/NDEP_Guidelines_for_discovery_events.pdf.
- SECOR International, Inc. 2000. "Subsurface Investigation Report, Duck Valley Shoshone-Paiute Reservation, Owyhee, Nevada." Prepared for BIA, Phoenix, Arizona. May.
- SECOR International, Inc. 2002. "Report of Findings from Soil Excavation and Groundwater Monitoring, Duck Valley Indian Reservation, Owyhee, Nevada." Prepared for BIA, Phoenix, Arizona. December.
- Shoshone-Paiute Tribes. Tribal website: <https://Sho-Paitribes.org>.



Shoshone-Paiute Tribes of the Duck Valley Reservation. 2016. "Public Water System Consumer Confidence Report." Prepared by the Water and Sanitation Department. Owyhee, Nevada. June 27.

SRK Consulting. 2001. "Groundwater Impact Assessment of Former BIA Road Shop on Owyhee Drinking Water Wells." Prepared for the Shoshone-Paiute Tribes, Duck Valley Indian Reservation, Owyhee, Nevada. May.

Stantec. 2009. "Summary Report, Well Installation, Abandonment and Monitoring Activities, October 2007 to May 2009." Prepared for BIA, Western Regional Office, Phoenix, Arizona. December 16.

U.S. BIA. "Report-61, Status of Mineral Resources Information for DVIR Owyhee County, Idaho and Elko County, Nevada."

U.S. BIA. 1994. "A Study of the Source of Contamination in Potable Water Wells in the Community of Owyhee, Nevada on the Duck Valley Indian Reservation Home of the Shoshone-Paiute Indian Tribes." Draft Report. November.

U.S. Environmental Protection Agency (EPA). 1990. "The Owyhee Community Groundwater Sampling Plan, Owyhee, Nevada." March 7.

U.S. EPA. 1996. "Soil Screening Guidance: User's Guide." Publication No. DPA/540/R-96/018. Office of Emergency and Remedial Response. July.

U.S. EPA. 2017. "Regional Screening Levels." <https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide-november-2017>. Accessed online, April 24, 2018.

U.S. EPA. 2018. Personal Communication. Email from Patrick Wilson, Regional Toxicologist, EPA Region 9, to William Desmond, Project Manager, Akana. April 25, 2018.

U.S. EPA, Region 9. 1995. Administrative Order on Consent Docket No. UIC-EO-95-001 to the U.S. BIA. June 16.



Table 1
Summary of Historic Soil Excavation Volumes
Groundwater Assessment Report
Duck Valley Indian Reservation

Source	Area	Excavation ID	Volume Removed (cubic yards)	Soil Remaining above Federal and Nevada TPH Action Level
Heating Oil Pipeline	West side of Highway 225, near Tribal Resources Building	L18-01/L33 L18-02	5	Diesel
	(2002) West of Highway 225, along northern border of D Street	L-18	24	Diesel
	West side of Highway 225, near houses #308-#312	L15 and L16	0	Diesel
	East of Highway 225, near old power plant	L29	400	Diesel, Gasoline
		L17	5	Diesel, Gasoline
		L17B	25	Diesel
		L13	650-800	Diesel
		L13A	25	Diesel
		L30	55	
		L31	75	Diesel
	Along residential street west of Highway 225, northwest of house #3115	L7 L36	500-600 15	Diesel (w) Diesel
	(2002) Along residential street west of Highway 225, south of house #312	L-7 north and south of C Street (L-7S, L-7N, L- 7C)	1,348	
	Northeast of Road Maintenance Building and north of Tribal Maintenance Building	L1 L2 L34	0 0 375	Diesel Diesel (w)
	(2002) Northeast of Road Maintenance Building and north of Tribal Maintenance Building	(L-34S and L- 34N)	560	
Discharge Pipeline	BIA Tribal Maintenance Building yard	D4, D5, D7, D10, D8, D9 (outlet)	115 50	Diesel, Gasoline

Table 1 (Continued)
Summary of Historic Soil Excavation Volumes
Groundwater Assessment Report
Duck Valley Indian Reservation

Source	Area	Excavation ID	Volume Removed (cubic yards)	Soil Remaining above Federal and Nevada TPH Action Level
Road Maintenance Building	Along west side of the Tribal Maintenance Building	S1-S6	90	
	East side of Tribal Maintenance Building; former 500-gal AST	S7	5	
	East side of building; former 280-gal AST	S8	5	
	South side of building; former 500-gal AST	S9	5	
	Drummed oil leakage area	S10	10	
	Tar spillage area	S11	10	
	Surface staining from equipment	S12	40	
Other USTs	East of Tribal Maintenance Building	U3-U6	25	Diesel
	East of Highway 225, near old power plant	U7-U10	60	
	Near house #3115	U12-U13	300	Diesel, Gasoline (w)
Other ASTs	Tribal Maintenance Building yard; former 1,000-gallon AST	A1-A4	25	

Notes : AST Aboveground Storage Tank

UST Underground Storage Tank

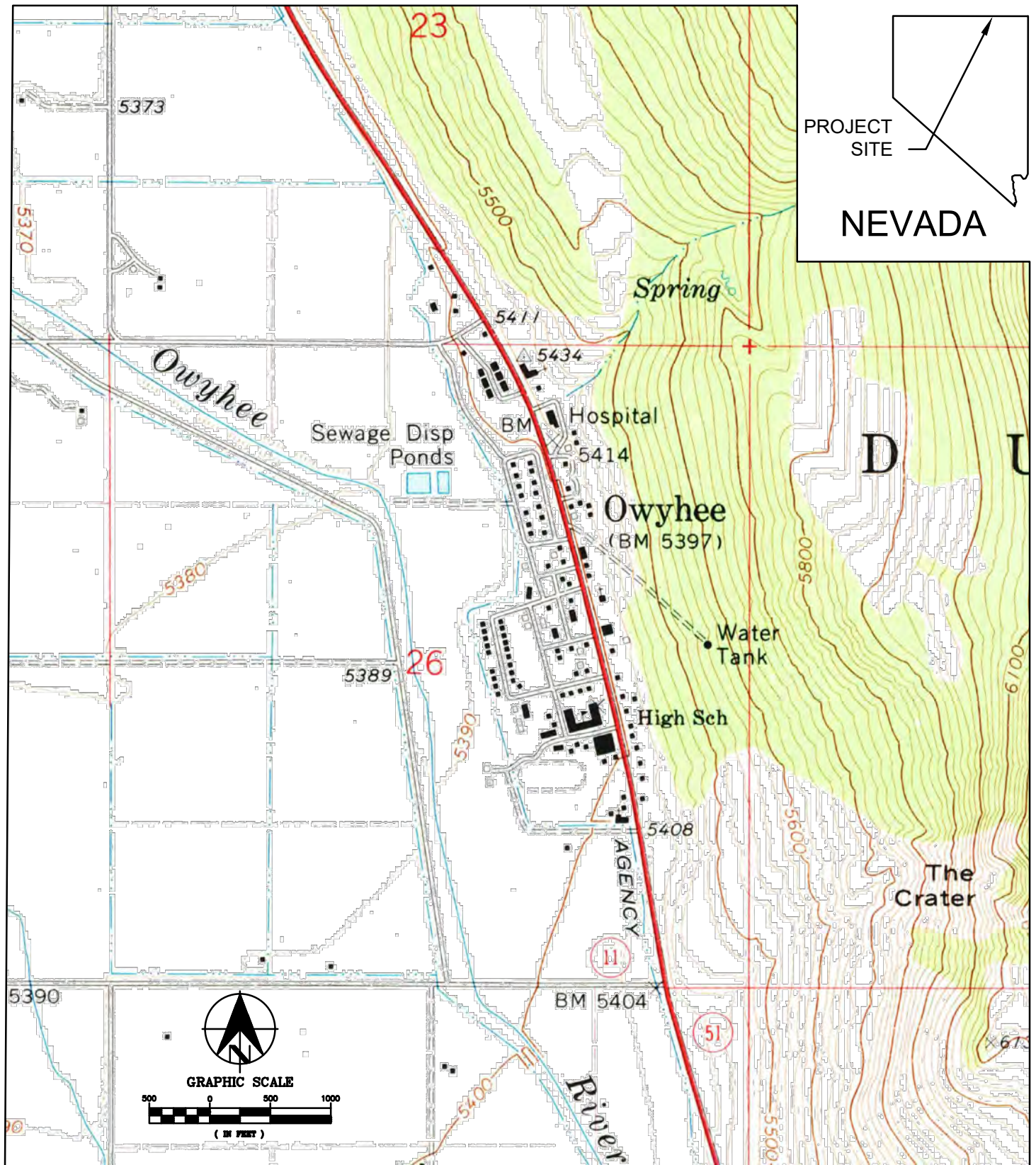
(w) Petroleum release in this area has impacted groundwater

Source : This is a reproduction of information gathered from SECOR International, Inc.

May 2000 Subsurface Investigation Report and SECOR International, Inc. December 2002

Report of Findings from Soil Excavation and Groundwater Monitoring.



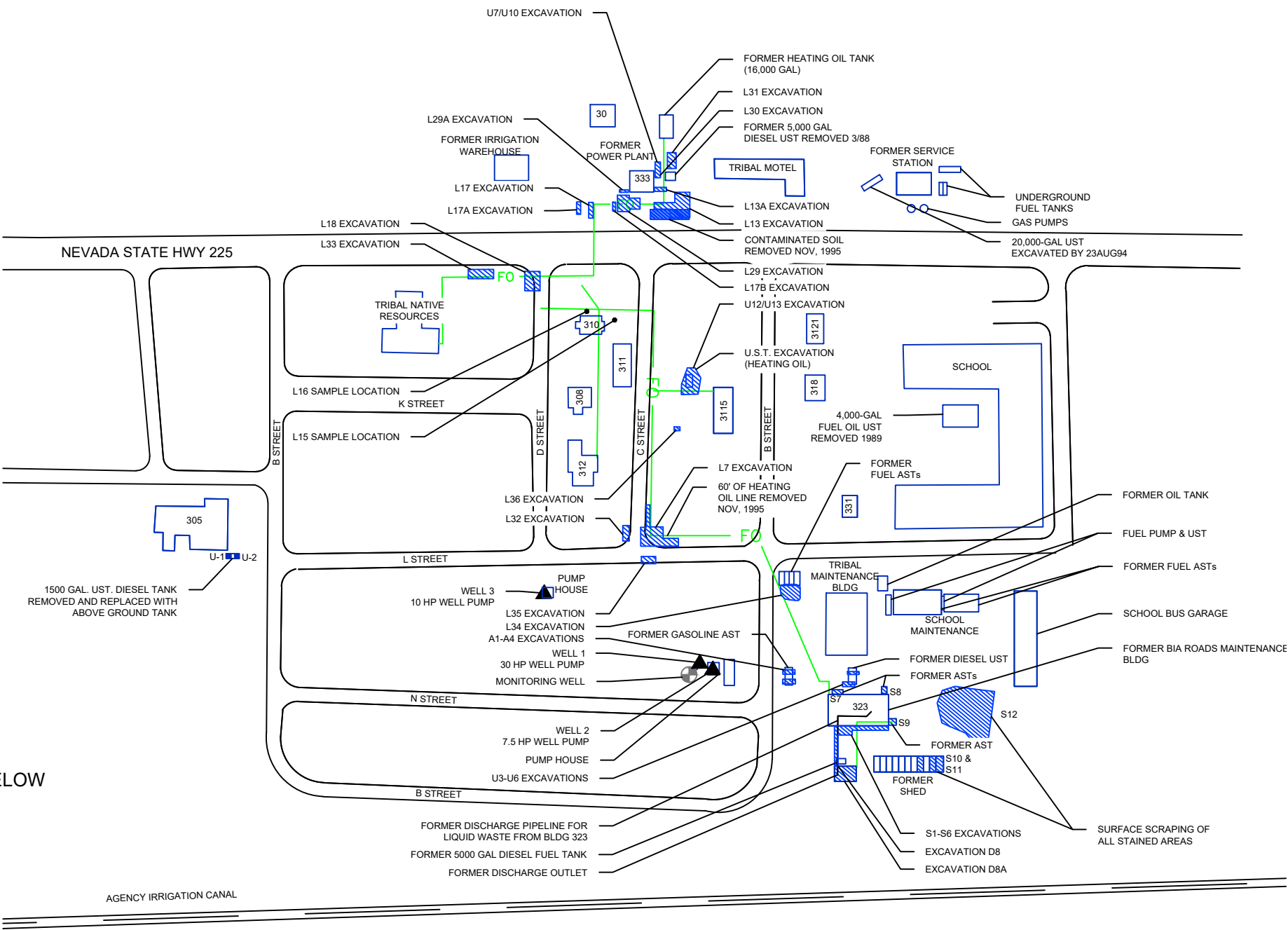


SOURCE: USGS 1974





P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Environmental\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURES 3 - 6_15.dwg 8/5/2021 10:27 AM
COPYRIGHT 2015, AKANA, ALL RIGHTS RESERVED



SOURCE: This is a reproduction of information gathered from SECOR International, Inc. May 2000. Subsurface Investigation Report, Duck Valley Shoshone-Paiute Reservation, Owyhee, Nevada

BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST
SCALES ACCORDINGLY



6400 SE Lake Road, Ste 270
Portland, Oregon 97222
Voice (503) 652-9090

BUREAU OF INDIAN AFFAIRS

WESTERN REGIONAL OFFICE

2600 N CENTRAL AVENUE,
PHOENIX, AZ 85001

DN
DESIGNED BY
DN
DRAWN BY
JB
CHECKED BY
08/04/2021
DRAWING DATE

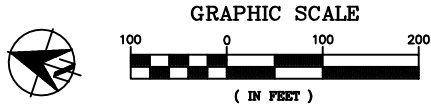
SUBMITTAL

DUCK VALLEY INDIAN RESERVATION, NV
CONTAMINANT SOURCE AND RELEASE AREA MAP
1999


16-005

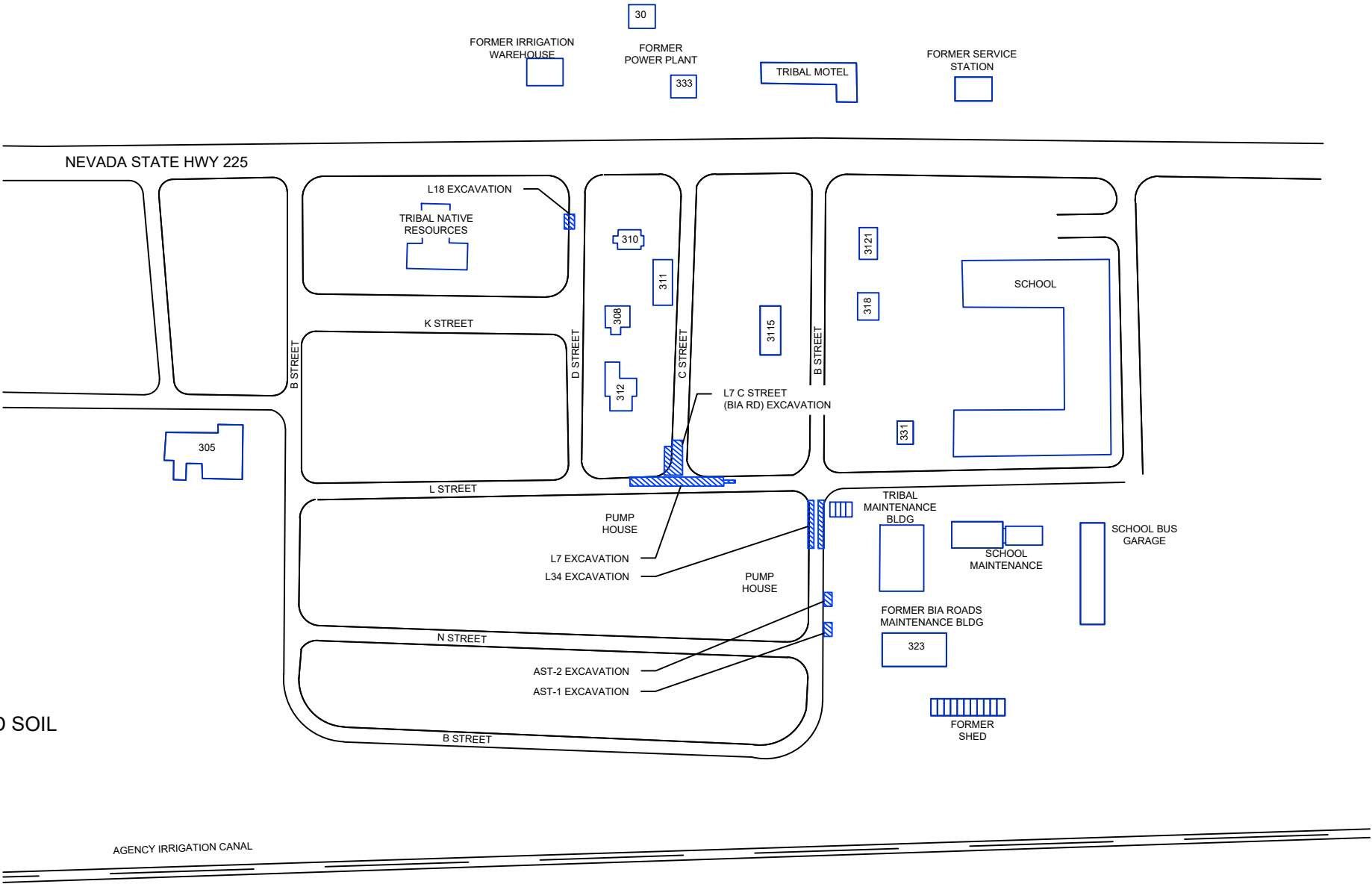
FIG. 3

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329 John Baker\FIGURES 3 - 6_15.dwg 6/2/2021 10:12 AM
COPYRIGHT 2015, AKANA, ALL RIGHTS RESERVED



LEGEND

 **AREAS OF HISTORICAL EXCAVATION**
ESTIMATED BOUNDARY OF IMPACTED SOIL
(>100 MG/KG TPH)



SOURCE: This is a reproduction of information gathered from SECOR International, Inc. December 2002. Report of Findings from Soil Excavation and Groundwater Monitoring, Duck Valley Indian Reservation Owyhee, Nevada

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY.					



6400 SE Lake Road, Ste 270
Portland, Oregon 97222
Voice (503) 652-9090

BUREAU OF INDIAN AFFAIRS

WESTERN REGIONAL OFFICE

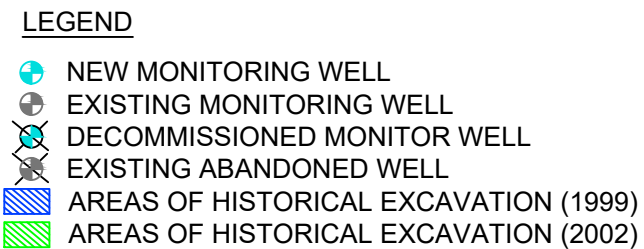
2600 N CENTRAL AVENUE,
PHOENIX, AZ 85001

DN
DESIGNED BY
DN
DRAWN BY
JB
CHECKED BY
06/02/2021
DRAWING DATE

SUBMITTAL

DUCK VALLEY INDIAN RESERVATION, NV
CONTAMINANT SOURCE AND RELEASE AREA MAP
2002

16-005
FIG. 4



SOURCE: This is a reproduction of information gathered from Stantec. December 16, 2009. Summary Report, Well Installation, Abandonment and Monitoring Activities, October 2007 to May 2009. Bureau of Indian Affairs, Duck Valley Indian Reservation, Owyhee, Nevada.

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY					



6400 SE Lake Road, Ste 270
Portland, Oregon 97222
Voice (503) 652-9090

BUREAU OF INDIAN AFFAIRS

WESTERN REGIONAL OFFICE

2600 N CENTRAL AVENUE,
PHOENIX, AZ 85001

DN
DESIGNED BY

DN
DRAWN BY

JB
CHECKED BY

06/02/2021
DRAWING DATE

SUBMITTAL

DUCK VALLEY INDIAN RESERVATION, NV

GROUNDWATER MONITORING WELLS
LOCATIONS

6-005

FIG. 5

APPENDIX A

SAMPLING and ANALYSIS PLAN/QUALITY ASSURANCE PROJECT PLAN

(XX Pages)

